The Dragon's Changing Appetite

How China's Evolving Seafood Industry and Consumption Are Impacting Global Seafood Markets

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China is the key driver of the world's seafood industry. In addition to supplying enough to meet its own domestic demand China has emerged as the key exporter supplying Europe, Japan and the US with affordable fish fillets and shellfish. But by the end of this decade, China's role will be profoundly different. Growing domestic incomes are driving demand for high value species, changing what China produces, exports and imports. China has the potential to become a USD 20 billion seafood import market within this decade, which would lead to a global price increase for most major premium seafood species as well as for the inputs needed to produce them, such as fishmeal and fish oil. China's processors and farmers will increasingly focus on domestic demand, while Western and other Asian producers will seek their fortunes by supplying species such as salmon, scallops and lobster to new consumers in China. Moreover, the race for control of primary production assets (e.g. fishing quotas and farming licences) will further intensify. The changing role of China will bring about a wave of opportunities as well as risks for companies across the global seafood industry.

Introduction

According to Chinese astrology, 2012 is the year of the Dragon. More precisely, it is the year of the Water Dragon, which occurs only once in 60 years. In a more literal way, China is a true 'water dragon' when considering the global marine protein industry, a diverse sector representing aquaculture[1], wild catch fisheries and seafood processing. China is the global champion of this industry in nearly every measurable way. Accounting for one-quarter of the world's seafood consumption, China is not only the largest market for seafood but also the largest producer, accounting for 40 percent of global seafood production and an impressive 60 percent of global aquaculture production. In addition, China is a key processing hub and is the world's leading seafood exporter with exports of over USD 16 billion in 2011. The country's booming aquaculture industry has built enough capacity for its own virtually insatiable domestic demand, while becoming the world's leading exporter. By bringing affordable processed whitefish and Western staples such as shrimp and tilapia to the market, China has become the seafood factory of the world.

But China is changing. Rising incomes are creating demand for premium seafood products, both domestic and imported, providing a new opportunity for exporters of premium seafood and also putting consumers in the West in direct competition for nearly all types of marine proteins. In parallel with this dynamic, rising wages in China put pressure on its competitive advantage as a processor for re-export. The current dynamics in China are affecting virtually every facet of the global marine protein industry, with implications for every seafood company and seafood consumer in China, the rest of Asia, Europe, the United States (US), Japan and Africa.

The dragon's changing appetite

Insatiable seafood demand

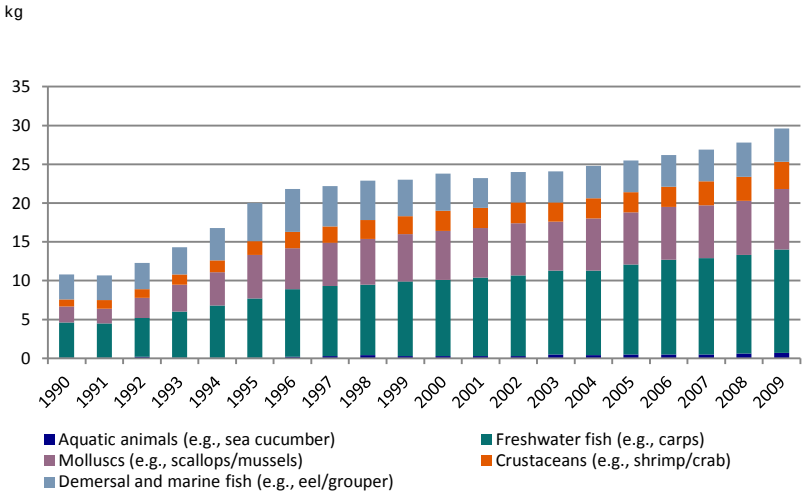
China is the world's largest seafood market, having overtaken the US and the EU, even on a per capita basis. China's staggering growth in per capita seafood consumption from slightly above 10 kilogrammes in 1990 to 30 kilogrammes in 2009 has been the key driver of seafood consumptionon on a global level (*see Figure 1*). Seafood is considered healthy and prestigious, and has no religious constraints as compared to beef, which is not eaten by most devout Chinese Buddhists, officially 22 percent of the Chinese population but unofficially higher.

[1] Aquaculture is defined as the farming of aquatic organisms such as fish, crustaceans, molluscs and aquatic plants. For the purposes of this report, aquatic plants are excluded.

However, Chinese seafood consumption is very different from that of developed markets, such as the US, Japan and even the more culturally similar Hong Kong. While in developed markets, marine species such as salmon, cod, pollock and tuna dominate the menu, China relies on freshwater species for 45 percent of its seafood consumption, mainly carp varieties. In addition, 26 percent of consumption is made up of low-value molluscs, such as arc shells, mussels, clams, cockles and low-value Chinese oysters.

Although the share of carp in Chinese seafood consumption has gradually increased over the last 20 years, we expect its demand to grow more slowly than that for the rest of the seafood spectrum. This is because carp consumption is relatively stronger in rural China, and due to urbanisation, demand for carp will not increase to the same extent as for other species. More importantly, carp is one of the least valuable of all the seafood products in China and therefore has the lowest income elasticity.

Figure 1: Chinese annual per capita seafood consumption, 1990-2009



Source: Rabobank, Food and Agriculture Organization of the United Nations, 2012

There is a taste for the premium end

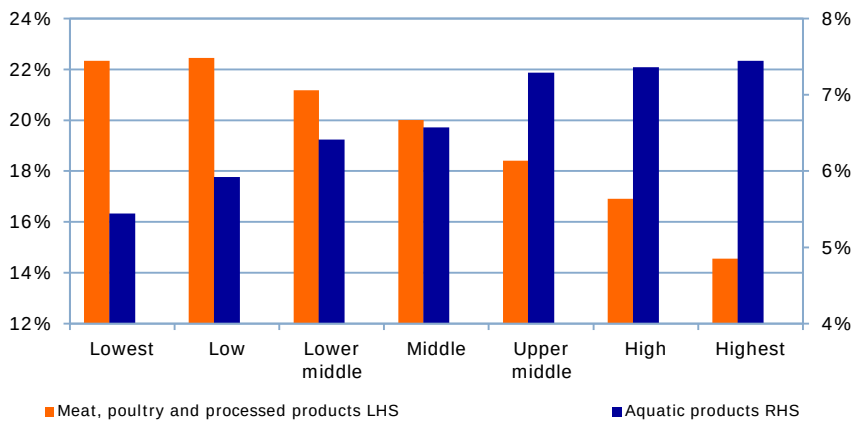
Many of the drivers of seafood consumption are similar to those of terrestrial meat consumption: population growth, urbanisation, expansion of modern retail and quick service restaurants (QSR), and improvement in the cold chain. However, seafood consumption is particularly sensitive to increasing incomes (i.e. income elasticity of demand is significantly higher than that of meat). When comparing expenditure on aquatic products and meat products across income groups, a clear pattern emerges. The percentage of food expenditure on meat products is highest for the lowest income groups at 22.3 percent and decreases to only 14.5 percent for the highest income groups (*see Figure 2*).

The pattern for aquatic product consumption across income groups is the opposite. Seafood represents 5.4 percent of food expenditure for the lowest income groups, but increases to 7.5 percent for the highest income groups. This consumption pattern is attributable to a switch to premium species as incomes increase. For instance, the highest 10 percent income groups consume more than seven times the volume of shrimp compared to the lowest income groups. In comparison, the difference in pork consumption between the highest and the lowest income groups is only 1.4 times the volume.

The strong link between income growth and seafood consumption is common in most East Asian countries and it is further supported by the cultural influence of China in the region. Even without the Western focus on the health aspects of omega 3, seafood is considered healthy across Asia. As the Chinese would say, it is good for the brain, eyes, skin and nutritional balance. In addition, certain species, such as abalone, shrimp, sea cucumber, scallops and large carnivorous marine fish (e.g. grouper and sea bass), are regarded as prestigious. In contrast to terrestrial proteins, the large variety of seafood provides a spectrum of prestige levels for Chinese consumers to switch to as wealth increases.

We expect strong demand for premium species in China. While historically, it has been carp and other fresh water fish that have driven seafood consumption in China, the more premium species will be responsible for consumption growth in the future.

Figure 2: Relative seafood and animal protein expenditure per income group



Source: Rabobank, China Statistical Yearbook, 2011

In parallel with locally produced premium seafood, there is a large and growing market for imported species that are becoming increasingly popular in China. Producers of scallops, mussels, oysters and other premium shellfish and crustaceans (e.g. lobsters and crabs) from the Americas, Australia and Europe are all targeting new customers in China. There are reports of demand expanding at rates above 20 percent per annum for niche shellfish, which is rapidly transforming China into the leading market for many high-end seafood products. With the exception of shrimp, many of the premium shellfish and crustaceans are wild caught and unlikely to experience growth in supply despite growing Chinese demand. Even shellfish industries such as mussels, scallops and abalones, which are also farmed as well as wild caught, are slow to respond to growing demand as more coastal area and, more importantly, new farming licences are needed in order to increase supply. Consequently, the rising demand in China will ultimately result in elevated global prices.

It is intuitive to expect a growing demand for imported premium crustaceans and molluscs as relatively similar products are already available in China. However, it is less clear how successful salmon, the favourite farmed seafood of the West, will be in China. Chinese consumers are largely unfamiliar with this species and its Western product forms. The fact that imports into China have more than trebled in the last 10 years makes the growth impressive and testifies to the strong demand for premium seafood in China, particularly for sushi. The increase in salmon imports also demonstrates the changing preferences of young affluent consumers, which are emerging as a new segment in the Chinese seafood market (*see Box 1*). We expect salmon to be one of a number of Western species that will enjoy growing demand in China as affluent consumers seek imported products produced in pristine waters, providing novelty and prestige.

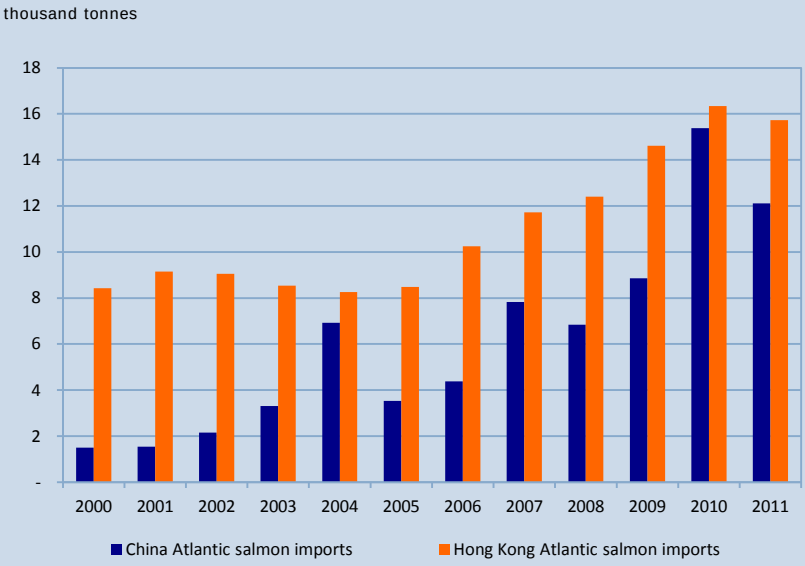
Box 1: Salmon the Prada of seafood in China

In China, salmon—consumed nearly exclusively as sashimi or sushi—is the Prada of the Chinese seafood market, viewed as a modern and prestigious import. Salmon, unlike domestic Chinese premium seafood, which is consumed at weddings and other major celebrations, is favoured by increasingly numerous young urban consumers. These are the same type of consumers who would purchase an expensive and rare iPhone or Prada shoes.

Chinese salmon imports from Europe (the key supplier of Atlantic salmon to China) grew from virtually nothing in 2000 to more than 12,000 tonnes in 2011. With Hong Kong imports included, this figure reaches close to 30,000 tonnes. This is a considerable amount, but still relatively small compared to the 2012 global salmon production of nearly 2 million tonnes.

Hong Kong's imports can be interpreted in two possible ways. First, if Hong Kong, with its population of 7 million, imports more salmon than China does with a population 200 times greater, the potential for salmon in mainland China is enormous. Second, a part of the salmon imported into Hong Kong is in fact diverted for consumption in China, but unfortunately, it is not possible to estimate how much. Hypothetically, assuming that 50 percent of Hong Kong's imports are consumed in China, the figures still indicates that Chinese salmon market has at least trebled in size in the last 10 years.

Figure 3: China and Hong Kong imports of Atlantic salmon, 2000-2011



Note: Imports from Norway, UK and Faeroe Islands represent the majority of the Atlantic Salmon supply consumed in China and Hong Kong

Source: Rabobank, UN Comtrade, 2012

Growing salmon consumption is testament to the influence of the Japanese kitchen in China as well as Westernisation of the Chinese consumer. Eating habits are already rapidly Westernising in China. KFC have brought about fundamental changes to the amount and way chicken is consumed. Although there is no single company to drive similar growth in sushi and sashimi, there is potential for similar consumption expansion for salmon. However, this will only occur when average incomes in China are significantly higher.

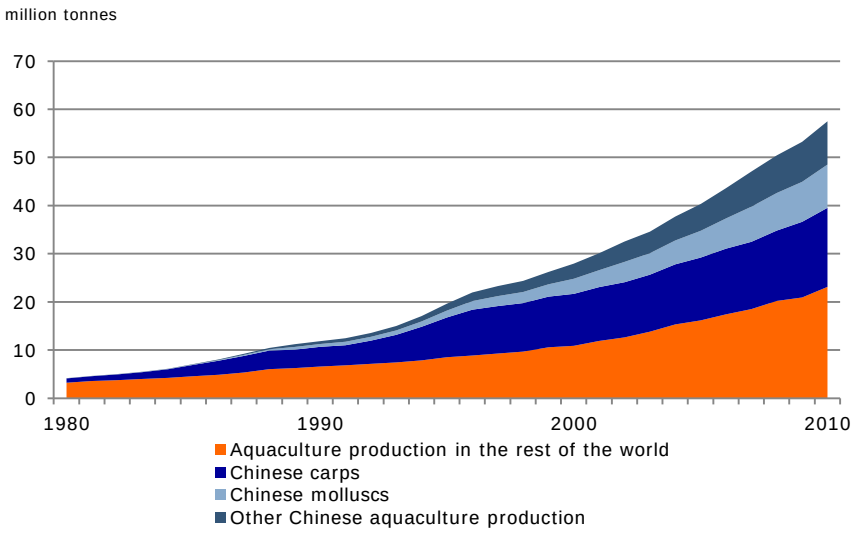
The world's aquaculture capital and growing fishing super power

Majority of aquaculture is low cost, low input species

More than 13 million fishermen and aquaculture farmers work to supply China's seafood market. The Chinese seafood industry is the world's largest and its diversity is second to none. Unlike in any other country, aquaculture—not wild catch—is the key source of seafood in China. The rise of China's aquaculture industry, from its modest beginnings in the 1980s and 1990s to the powerhouse it is today, has been the key driver of global aquaculture production and currently represents over 60 percent of the world's production (*see Figure 4*). The majority of Chinese aquaculture is based on low-intensity production systems[2] with carp and low-value molluscs accounting for 45 percent and 26 percent of production, respectively.

[2] Low-intensity production systems are food production systems with a relatively low level of variable inputs such as feed.

Figure 4: Global and Chinese aquaculture production, 1980-2010

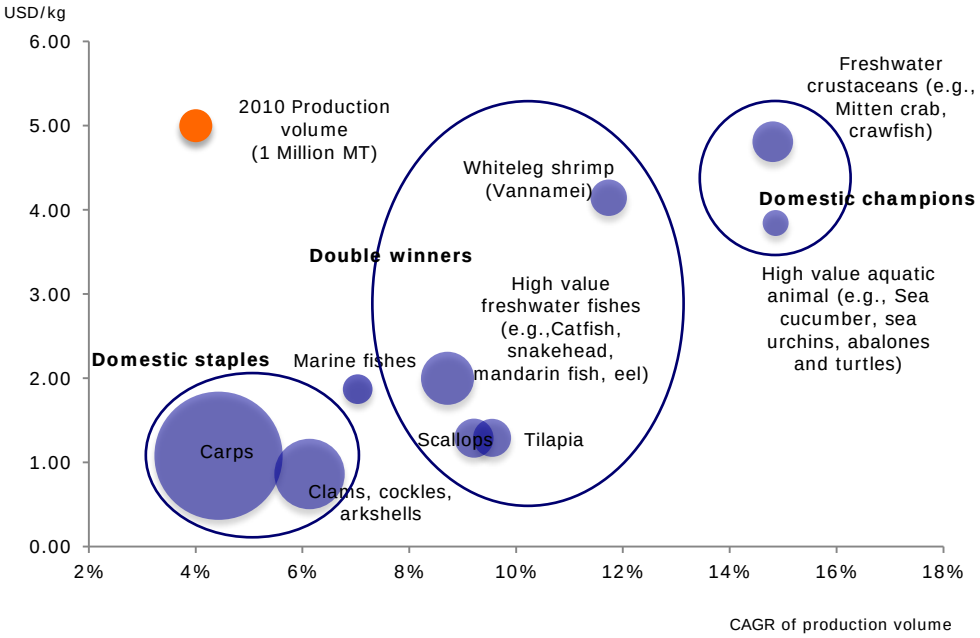


Note: Plants and miscellaneous animal products are excluded

Source: Rabobank, Food and Agriculture Organization of the United Nations, 2012

Carp production is an artisanal polyculture industry that uses a combination of four carp species, with only two species requiring supplemental feed. The feed is low protein and low value with little inclusion of imported commodities and no fishmeal content. Molluscs require even less inputs. As molluscs are filter-feeders, no additional feed is required for production. It is logical that China, a country with a relatively low per capita availability of feed commodities and arable land, would develop a protein industry that uses low amounts of both of these scarce resources. Considering resource utilisation as well as environmental impact, carp and molluscs are two of the most sustainable protein industries in the world.

Figure 5: Chinese aquaculture production volume and 5-year average implied value dynamics



Source: Rabobank, Food and Agriculture Organization of the United Nations, 2012

Farmers produce what the market wants

Trading up in Chinese seafood consumption corresponds to a clear link between unit value and production growth in the various Chinese aquaculture industries (*see Figure 5*).

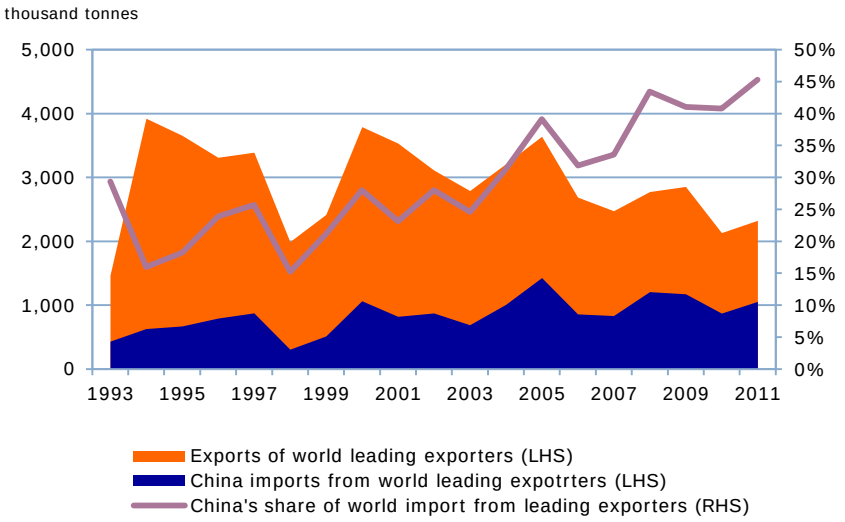
'Domestic champions' or local niche aquaculture industries, which have the highest value for Chinese consumers (e.g. mitten crab, abalones and sea cucumbers) are driven by booming domestic demand and recorded a supply expansion of above 15 percent per year between 2005 and 2010. A second group of aquaculture products (e.g. white shrimp, tilapia and scallops), are dubbed 'double winners' because they have high value and strong domestic demand but are also successful on the export market. This group is also expanding at a fast

rate of above 8 percent per annum. In times of wavering global demand, these industries are likely to turn towards the domestic market. In contrast, 'domestic staples' (e.g. carp and low-value molluscs), which had been the driver of the Chinese aquaculture industry, are now growing at a far lower rate. These species are expected to continue to account for the bulk of Chinese aquaculture, but will not achieve the growth seen in the past.

Clearly, the growth of premium aquaculture species is a key driver of the Chinese aquaculture industry. Although we do not expect Chinese aquaculture to repeat the volume growth achieved in the past, aquaculture is likely to continue to see growth in value terms. The rise of the shrimp industry is an astonishing example of value creation, where in a period of less than a decade China created what is probably the world's single most valuable aquaculture industry, generating an export value above USD 2 billion and domestic sales possibly worth three to four times that amount (*see Box 2*).

Another consequence of China's growth in farming premium species is the need for inputs, such as equipment for hatcheries, farms, water treatment technology and feed commodities. All of these input requirements present opportunities for Western exporters as well as investors. Moreover, as many of the high value species are carnivores or omnivores, they require varying amounts of fishmeal in their diets. Fishmeal is largely produced from small pelagic fishes, such as Peruvian anchovetta, which are wild catch species. The harvest of small pelagics has not increased for over 20 years. There is even a noticeable mild decline in export availability.

Figure 6: Chinese share of traded fishmeal, 1993-2011



Note: World leading exporters are Peru, Chile, Norway, Denmark, Iceland, Faeroe Islands, Thailand, US, UK and Morocco

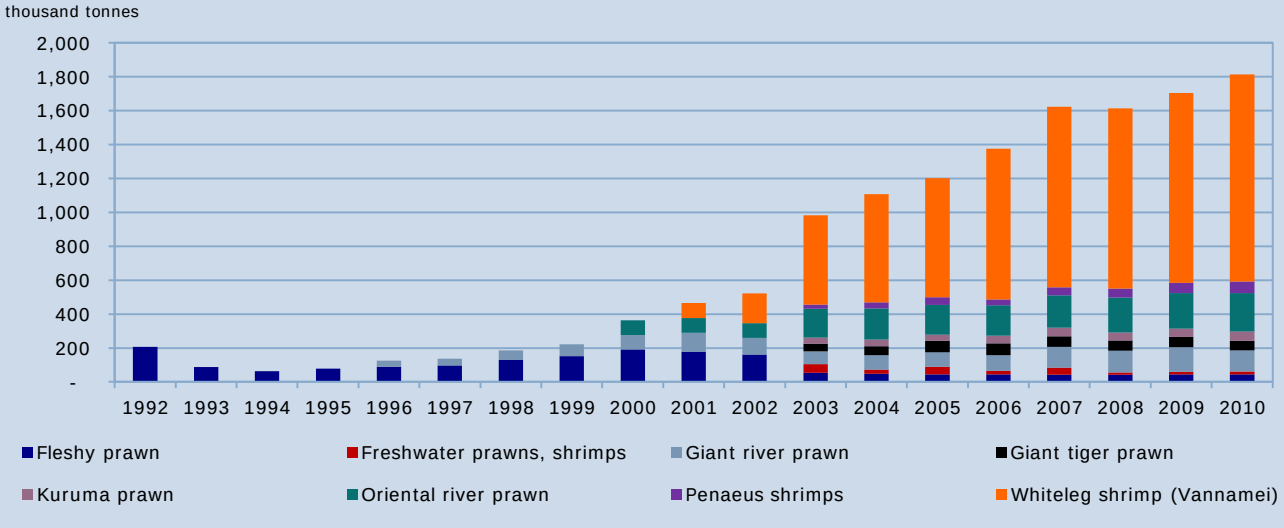
Source: Raboank UN Comtrade, 2012

Consequently, the rise of Chinese aquaculture—especially the production of the more premium species—will affect all aquaculture producers globally as competition for scarce fish meal increases. China's share of the global fishmeal trade has approximately doubled from 20 percent in the 1990s to over 45 percent in 2011 (*see Figure 6*). Since 2004, fishmeal prices have increased by 300 percent. Western aquaculture industries (e.g. salmon farming) as well as the domestic Chinese pork industry, which competes with aquaculture for fishmeal, will need to pay increasingly higher prices for this scarce commodity. This fierce competition has two clear beneficiaries: fishmeal producers and harvesters of small pelagics.

Box 2: The rise of Chinese shrimp aquaculture industry

The Chinese shrimp industry, now the world's largest and probably one of the most valuable aquaculture industries, emerged in a period of a few years. The combination of booming domestic demand and the arrival of new technology (vannamei shrimp) was the recipe for success. Vannamei is originally a South American species and has qualities superior to domestic Chinese shrimp varieties: higher disease resistance, faster growth rate, tolerance to higher stocking density, and ultimately much higher yields per hectare at a lower unit cost. These factors led to an unprecedented expansion in production (*see Figure 7*).

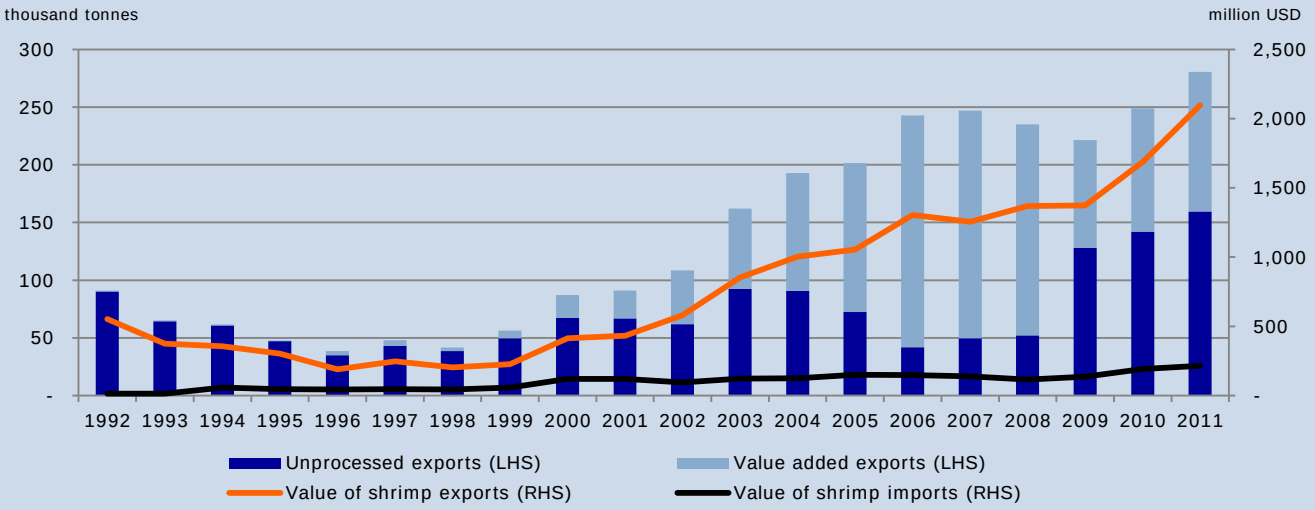
Figure 7: Chinese shrimps production by species (1992-2010)



Source: Rabobank, Food and Agriculture Organization of the United Nations, 2012

The shrimp industry has been so successful that, despite its booming domestic demand, China has also emerged as a key exporter. In 2011, China exported over USD 2 billion in shrimp, an export value second to Thailand (*see Figure 8*).

Figure 8: Chinese frozen and processed shrimp export volumes and combined import and export values (1992-2011)



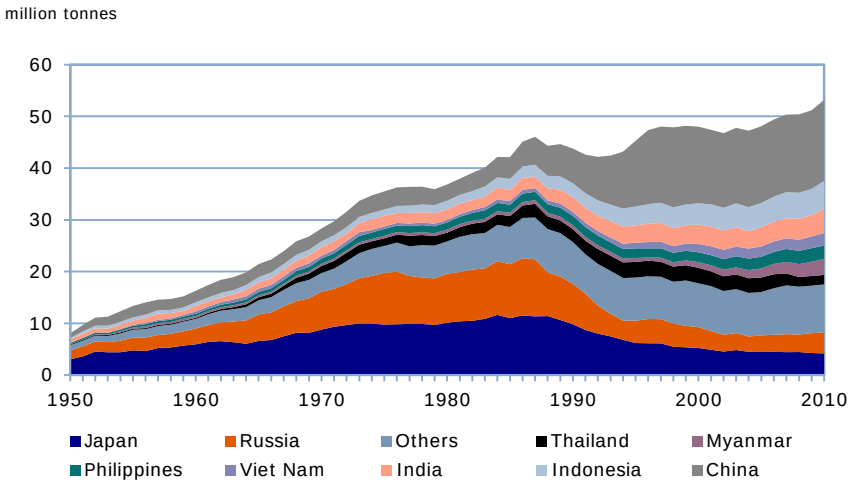
Source: Rabobank, UN Comtrade, 2012

Western shrimp buyers have had concerns that it is only a matter of time before the Chinese shrimp industry will not be able to keep up with domestic demand and China will switch from being a net exporter to a net importer, driving up global shrimp prices. But although imports are increasing, in the absence of a major natural disaster, there is little to suggest that the Chinese shrimp net export position will change in the short or medium term. Nevertheless, it is clear that developments in China can be the pace-setter for the global shrimp price dynamics.

Race for global fishing resources

Given the booming domestic demand for fishmeal and premioum marine fish and cephalopods, it is no coincidence that China has worked hard to build a formidable fishing fleet. What is truly impressive is the rapid development of the long distance fishing (LDF) fleet during the early 1990s (*see Figure 9*).

Figure 9: Marine wild catch of key Asian fishing nations 1950-2010



Source: Rabobank, Food and Agriculture Organization of the United Nations, 2012

As a country with a relatively small marine exclusive economic zone (EEZ), China did not have a large LDF fleet up until the early 1990s. According to a comprehensive document addressing China's role in global fisheries published by the European Commission in 2012, with 1,900 large vessels China now has the world's largest LDF fleet[3]. In the short space of 10 years, China has emerged as the world's leading marine fishing nation. According to the report, the enormous fleet was originally government owned but is currently 70 percent privately owned, although still heavily dependent on subsidies. The Chinese fleet operates primarily in African waters targeting a wide range of marine species, including small pelagics for the production of fishmeal as well as high-end species such as tuna, and large pelagics and cephalopods such as squid. The report estimates the ex-vessel value of the Chinese LDF fleet at approximately USD 9 billion per year, but also suggests that the fleet may be too large for the targeted resources and may need restructuring and more transparency.

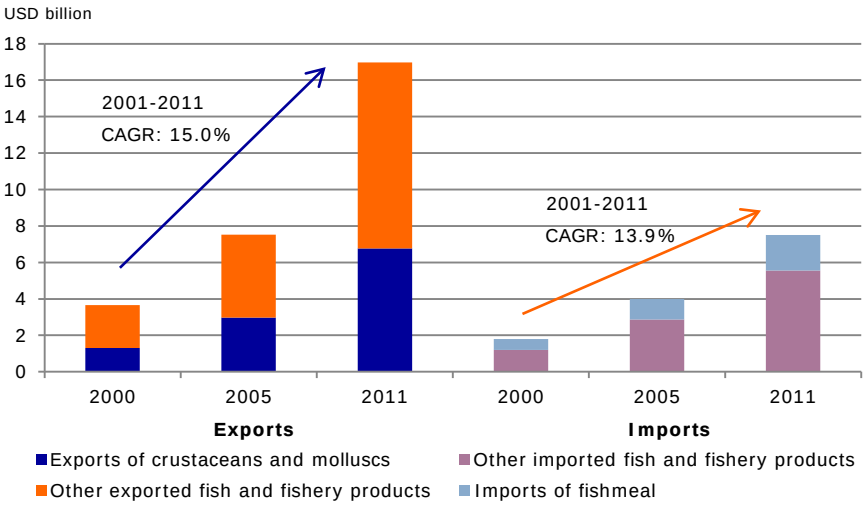
The unlikely seafood export champion

Seafood: China's No. 1 agricultural export

Despite its 1.34 billion seafood-loving consumers and relatively low per capita marine resource availability, China has become the world's leading seafood exporter, far above Norway and Thailand, the global No. 2 and 3, respectively. In 2011, China exported over USD 16 billion in seafood products, a figure that has grown at an astonishing CAGR of 15 percent in the period between 2000 and 2011 (*see Figure 10*). The Chinese government projects that exports will surpass the USD 20 billion mark in 2012. This makes seafood China's No 1 in agricultural export by a huge margin, confirming China's global competitiveness in seafood production. China's seafood exports are based on two different business models, one is the processing of imported wild caught seafood for re-export, and the other is the export of domestically produced aquaculture species.

[3] The Role of China in World Fisheries, European Parliament Director General for Internal Policies, 2012

Figure 10: Chinese export and import dynamics and major traded products, 2000-2011

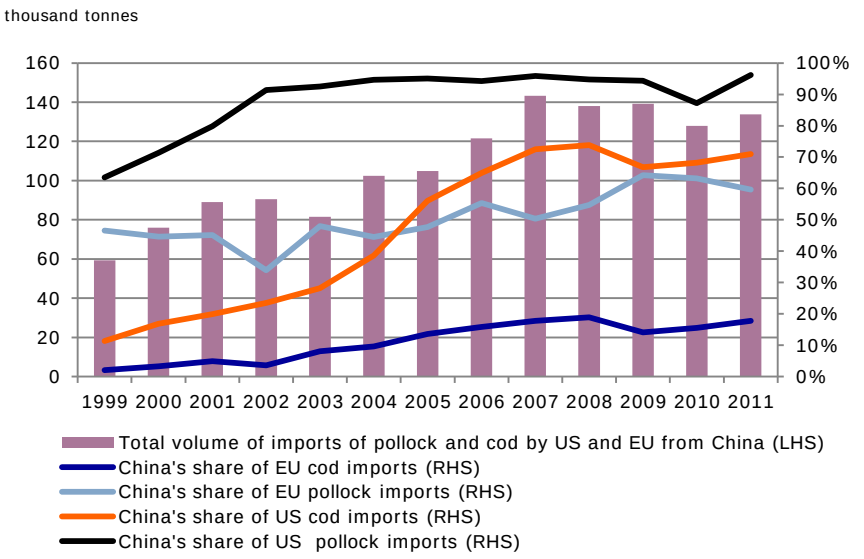


Source: UN Comtrade, 2012

The seafood factory of the world

China is considered the world's seafood processor. In the last 10 years, Chinese white fish processors—concentrated in five coastal provinces (Shandong, Liaoning, Zhejiang, Fujian and Guangdong)—have more than doubled their exports to the EU and the US and have become the dominant suppliers of cod, pollock and other groundfish popular in the West (*see Figure 11*).

Figure 11: China's export volumes and share of imports of cods and pollock into the US and the EU, 1999-2011



Note: The US and Europe are the two largest importer regions and dominate the imports of groundfish.

Source: NOAA Fisheries 2012, EUROSTAT, 2012

Groundfish species are caught primarily in Russian, US and Norwegian waters. These are well regulated and sustainable fisheries. Although this means there is little risk of overfishing, the global supply will not increase much further than it has in the last few years. The Chinese processing industry has diversified into a few more species, such as wild salmon, but overall future growth is only possible by capturing a larger share from other processors, which is increasingly more difficult as China's market share is already very high. Moreover, Chinese incomes and minimum wages have increased at a record pace and are now much higher than those in competing fish processing countries such as Vietnam. Also, the higher the Chinese wages become, the more likely processing will be moved closer to the markets in Europe and the US, or onto factory vessels. This is a far more expensive alternative, but the final product processed closer to the market enjoys a premium due to single freezing as opposed to double freezing, which is required when processing in China. Moreover, Russia, which is the leading supplier of raw material to the Chinese re-exporting industry, may make it more difficult for Chinese factories to obtain raw material. The

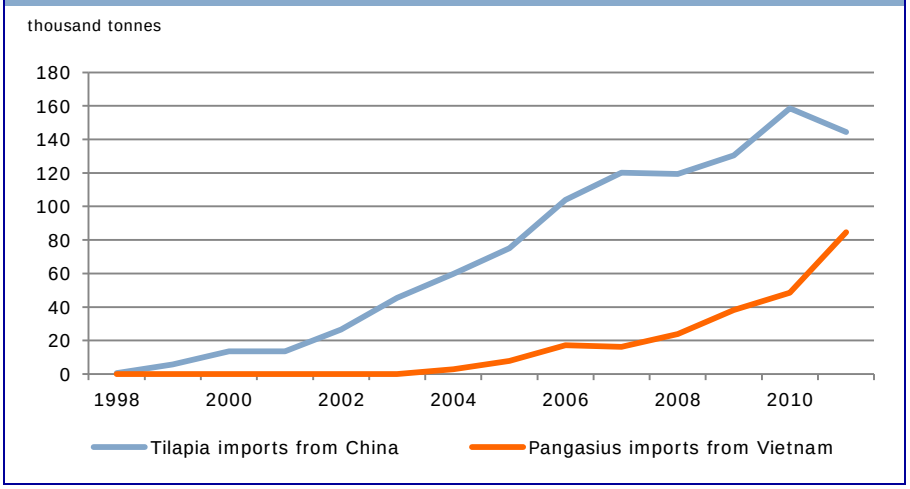
Russian government has recently stated that they will strive to increase value creation and employment within Russia based on Russian marine resources. They will also promote consumption of Russian fish on the domestic market. This could be a future threat to the Chinese reprocessing industry.

These are important challenges facing the Chinese reprocessing industry. Nevertheless, this industry will remain the largest and most efficient seafood processor in the world for many years to come. A combination of skilled employees, good infrastructure, access to capital and unrivalled scale as an industrial hub will ensure continuation of the industry. For the medium term, investing in mechanisation may help maintain labour productivity despite rising incomes. The Chinese re-exporting industry can seek to strengthen its position in the value chain through vertical integration by acquiring Western producers of the final product or by controlling the supply of the raw material. A further growth option is to diversify into new markets. Russia and Brazil are becoming important new markets, but in the long term the goal will be developing the domestic Chinese market for processed frozen seafood. Despite impressive performance in recent years, our expectations are that Chinese exports based on reprocessing will grow at a fraction of the rate achieved in the past. It is a also possible that the industry will contract and rationalise in the medium to long term.

Aquaculture-based export champions

Future Chinese export growth will come from aquacultured species which include a number of fish, molluscs and crustaceans, such as vannamei shrimp. Tilapia, a species native to the Nile in Egypt, is another non-native species which has enjoyed export success. China is the leading exporter of tilapia globally and dominates the frozen tilapia fillet market. Although tilapia is consumed globally, its mild taste has been a runaway success in the US market, which is now the world's largest importer of tilapia.

Figure 12: US imports of tilapia and pangasius,1992-2011



Source: Rabobank, NOAA Fisheries, 2012

In just 10 years, tilapia has changed from an unknown product to the fourth most popular seafood species in the US, only behind shrimp, canned tuna and salmon. Chinese frozen tilapia filets have effectively created a new low-cost seafood category. However, a new contender—Vietnamese pangasius—has recently arrived, challenging for supremacy in the low-end white fish fillet market. Also a farmed fresh water fish with a mild taste, Pangasius is a versatile product, suitable for value-added products demanded by Western consumers. It has a white colour even when raw, and arguably, a lower cost of production than tilapia. Pangasius has been rapidly growing in the market created by tilapia (*see Figure 12*). The Chinese drought in 2011 created a shortfall in tilapia production and consequently rising prices. This opportunity was quickly seized by pangasius producers to further expand their US market share. 2012 export figures of Chinese tilapia to the US are already showing a strong recovery, but low prices and high feed costs have eroded profitability for tilapia farmers. We do not expect the sector to continue to grow at the same rate as it has in the past.

New exportable species may emerge in China, but given resource constraints and the macroeconomic dynamics in Western markets, we do not expect the success recorded in the past to be repeated. The astonishing export CAGR of 15 percent recorded in the last decade is likely to decline to low single digits within the next few years. In contrast, we expect the

CAGR of imports to continue and possibly accelerate. Currently, China's imports are only a fraction of those of the EU, the US and Japan (USD 26.2 billion, USD 17.4 billion and USD 17.3 billion, respectively). Chinese imports are still mainly low-value unprocessed ground fish for re-export or fishmeal used for feed. Also, as the Chinese LDF fleet cannot expand any further (and may even need to contract), the supply of premium product will come from a number of domestic niche aquaculture industries or imports. We expect both supply sources to grow rapidly in the future, with double-digit growth rates. Targeting the rising premium seafood market in china represents a real opportunity for global seafood producers. Particularly products from pristine waters in Western countries will be perceived as a high quality luxury.

The impact of this will be felt across all subsectors of the global seafood industry, from fishmeal producers to exporters of salmon, scallops and lobsters

China's impact on the global seafood industry so far has been to increase supply. Carp and molluscs have satisfied China's own need for affordable seafood, while its export-oriented industry supplied USD 16 billion of processed ground fish fillets, shrimp, tilapia and many other seafood products to the world markets. However, China's impact on the global seafood industry in the future will be profoundly different.

Conclusion: China the driver of premium seafood consumption

The last 20 years have seen China rise to become the great seafood factory of the world. The next two decades will see China transform into a seafood consumer. This dynamic will have a profound effect on the global seafood industry. New aquaculture industries in China are emerging to satisfy its need for high-value species. The high income elasticity of seafood, especially when considering premium seafood, indicates that this is still the beginning of this trend.

The astonishing success of white shrimp is an example of the rise of large aquaculture industries in China based on domestic demand as well as export opportunities. It is hard to speculate which will be the next star species but freshwater prawns, crabs, abalones, sea cucumbers and various other high-value marine and fresh water fish are all candidates. However, despite their stellar growth China's aquaculture industry and LDF fleet are unlikely to keep up with the changing demand pattern. Imports will play a key role, with the value of Chinese imports rising to match those of the US or Japan within this decade. This will also bring Western and Chinese consumers in direct competition. As many premium seafood industries have limited capacity to increase supply, we can expect price support for years to come, even for farmed Western species such as Atlantic salmon. Other winners will be the owners of primary production assets, fishing quotas (in well-regulated fisheries) and farming licences whether in Asia or the West.

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